

CLAIMS:

What is claimed is:

- 1 1. A method for loading a class, comprising:
2 loading a class;
3 inserting an immutability flag into the class;
4 determining whether the class is immutable; and
5 setting the immutability flag if the class is
6 immutable.
- 1 2. The method of claim 1, wherein the step of
2 determining whether the class is immutable comprises:
3 parsing the bytecode of the class.
- 1 3. The method of claim 2, wherein the step of
2 determining whether the class is immutable further
3 comprises:
4 determining whether the class can be modified after
5 it is created.
- 1 4. The method of claim 3, wherein the step of
2 determining whether the class can be modified comprises
3 determining whether all properties of the object are
4 marked private.
- 1 5. The method of claim 3, wherein the step of
2 determining whether the class can be modified comprises
3 determining whether there are any non-private methods
4 that update properties of the class.

1 6. The method of claim 1, further comprising:
2 receiving a request to invoke a server application;
3 examining an argument in the request;
4 if the argument is an object, determining whether
5 the object is immutable; and
6 if the object is immutable, passing a reference to
7 the object rather than a clone of the object.

1 7. The method of claim 6, wherein the step of
2 determining whether the object is immutable comprises:
3 determining whether an immutability flag for the
4 object is set.

1 8. A method for invoking an object, comprising:
2 receiving a request to invoke an object;
3 examining an argument in the request;
4 if the argument is an object, determining whether
5 the object is immutable; and
6 if the object is immutable, passing a reference to
7 the object rather than a clone of the object.

1 9. The method of claim 8, wherein the step of
2 determining whether the object is immutable comprises:
3 determining whether an immutability flag for the
4 object is set.

1 10. The method of claim 8, further comprising:
2 if the object is not immutable, passing a clone of

3 the object as the argument.

1 11. An apparatus for loading a class, comprising:
2 loading means for loading a class;
3 insertion means for inserting an immutability flag
4 into the class;
5 first determination means for determining whether
6 the class is immutable; and
7 setting means for setting the immutability flag if
8 the class is immutable.

1 12. The apparatus of claim 11, wherein the first
2 determination means comprises:
3 parsing means for parsing the bytecode of the class.

1 13. The apparatus of claim 12, wherein the first
2 determination means further comprises:
3 second determination means for determining whether
4 the class can be modified after it is created.

1 14. The apparatus of claim 13, wherein the second
2 determination means comprises means for determining
3 whether all properties of the object are marked private.

1 15. The apparatus of claim 13, wherein the second
2 determination means comprises means for determining
3 whether there are any non-private methods that update
4 properties of the class.

1 16. The apparatus of claim 11, further comprising:
2 receipt means for receiving a request to invoke a
3 server application;
4 examination means for examining an argument in the
5 request;
6 third determination means for determining whether
7 the object is immutable if the argument is an object; and
8 reference means for passing a reference to the
9 object rather than a clone of the object if the object is
10 immutable.

1 17. The apparatus of claim 16, wherein the third
2 determination means comprises:
3 means for determining whether an immutability flag
4 for the object is set.

1 18. An apparatus for invoking an object, comprising:
2 receipt means for receiving a request to invoke an
3 object;
4 examination means for examining an argument in the
5 request;
6 determination means for determining whether the
7 object is immutable if the argument is an object; and
8 reference means for passing a reference to the
9 object rather than a clone of the object if the object is
10 immutable.

1 19. The apparatus of claim 18, wherein the determination
2 means comprises:

3 means for determining whether an immutability flag
4 for the object is set.

5 20. The apparatus of claim 18, further comprising:

6 clone means for passing a clone of the object as the
7 argument if the object is not immutable.

1 21. A computer program product, in a computer readable
2 medium, for loading a class, comprising:

3 instructions for loading a class;
4 instructions for inserting an immutability flag into
5 the class;
6 instructions for determining whether the class is
7 immutable; and
8 instructions for setting the immutability flag if
9 the class is immutable.

1 22. A computer program product, in a computer readable
2 medium, for invoking an object, comprising:

3 instructions for receiving a request to invoke an
4 object;
5 instructions for examining an argument in the
6 request;
7 instructions for determining whether the object is
8 immutable if the argument is an object; and
9 instructions for passing a reference to the object
10 rather than a clone of the object if the object is
11 immutable.